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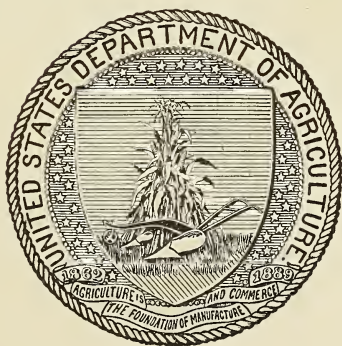
FARMERS' BULLETIN No. 248.

THE LAWN.

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U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
OFFICE OF THE CHIEF,
Washington, D. C., February 10, 1906.

SIR: I have the honor to transmit and to recommend for publication as a Farmers' Bulletin the accompanying paper on "The Lawn," prepared by Prof. L. C. Corbett, Horticulturist, in charge of the Arlington Experimental Farm.

Respectfully,

B. T. GALLOWAY,
Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

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THE LAWN.

INTRODUCTION.

The greensward is the canvas upon which all architectural and landscape effects are produced. A lawn may vary in extent from a few square feet at the side of the steps leading to the brownstone front of the city dwelling to the broad acres of extensive parks. It matters little whether the extent of a lawn be great or small, its inherent qualities are the same, and its intrinsic worth is determined by its character and the manner in which it is kept. Green grass is not only of great economic value, but it is also of great æsthetic value. The herbage of the field is the primary dependence of all animal life, and it is the green color, the sweet fragrance, and the soothing effect of nature which come from well-kept greenswards that make them so congenial to man. Grass is nature's balm and healing for all erosive scars. Nature abhors rough edges and broken places, and immediately proceeds to cover such ugly spots with green grass. Man likes to get his feet upon the soil, but better still upon the soft, yielding greensward. Rich rugs and carpets do not give the elastic spring that the well-made and well-kept greensward yields.

A lawn is the accompaniment of every effort on the part of man to beautify the surroundings of his abiding place. The great increase of interest in suburban and rural life has caused a corresponding increase of interest in matters pertaining to the making and maintenance of lawns. Suburban railways, the extension of electric lines into the country, and the return of man to natural ways of living are all factors contributing to the growing interest in matters pertaining to lawn making.

GENERAL CHARACTERISTICS OF LAWNS.

In general, a lawn should be beautiful and it should be useful. Its beauty depends upon the contour of the land, the color and texture of the grass, and the uniformity of the turf. The use of the lawn is

to provide a suitable setting for architectural adornment and landscape planting. Every device should be employed when working with small areas of ground to give the lawn as great extent as possible. The buildings should be well back, the foundation not too high, and the grading of the ground should be slightly convex—that is, a gently convex, rolling surface from the base of the foundation to the street line—rather than concave. A convex surface tends to give the effect of increased area, while a concave surface seemingly shortens distance. The extent of a lawn is also amplified by preserving as large areas of unbroken greensward as possible. This means the use of trees and shrubs only upon borders or margins of the lawn, rather than a promiscuous dotting of them over the greensward.

THE SOIL.

The ideal soil for a lawn is available in but few cases where it is desirable to establish a greensward. Ordinarily the lawn in which a man is most interested is that immediately surrounding his abiding place. The soil of this immediate locality is, in general, greatly modified because of building operations or necessary grading. The soil with which one has to deal, therefore, is seldom a normal soil of the locality. In general, it is a portion of the surface soil mixed with more or less of the subsoil which has come from excavation in making the foundations of a house. Large lawns and parks are not, as a rule, so subject to difficulties of this kind as are small private grounds. The problem before us, then, is that of converting not a normal but an abnormal soil into a suitable and congenial place for the growing of grasses.

The ideal soil for grasses best suited for lawn making is one which is moderately moist and contains a considerable percentage of clay—a soil which is somewhat retentive of moisture, but never becomes excessively wet, and is inclined to be heavy and compact rather than light, loose, and sandy. A strong clay loam or a sandy loam, underlaid by a clay subsoil, is undoubtedly the nearest approach to an ideal soil for a lawn; it, therefore, should be the aim in establishing a lawn to approach as near as is possible to one or the other of these types of soil. In many localities it will, however, be very difficult to produce by any artificial means at one's command a soil which will approach in texture either of the types recommended. Our efforts, nevertheless, should be directed to attaining as closely as possible these ideals.

Where a pure sand or a light sandy soil is the only foundation for the lawn, a top-dressing of 2 or 3 inches of clay should be given and incorporated with the first 4 to 6 inches of the sand, and after this, if possible, the area should be used for the production of some green

crop which gives an abundance of vegetable matter.^a In latitudes south of Washington, D. C., cowpeas and soy beans, and in districts north of this red clover, vetches, and Canada peas are suitable for this type of soil improvement. These crops, if allowed to occupy the land until their maximum growth is attained and then plowed under, will act very beneficially upon the structure of the soil in making it more retentive of moisture, better able to hold fertilizers applied to it, and less liable to allow the greensward upon it to be killed out in times of drought.

GRADING.

Before definite preparations are made for the seed bed, the surface of the lawn should be reduced to the desired grade. In large areas a gently undulating or broken surface is much more pleasing than a uniformly graded surface. Such a surface also adapts itself better to plantations of trees and shrubs. For small grounds of less than an acre in extent the grading should be comparatively uniform and of the simplest possible character. The general statement made in regard to the contour of the surface is sufficient for guidance in grading such small areas.

PREPARATION OF THE SOIL.

Since the lawn is intended to be a permanent feature of the decoration of a place, its endurance or span of life is of utmost importance. In general, grass seeds are small and the surface seed bed for the reception of these seeds need not be more than 1 inch in depth; but since the grasses, as they become established, send out long, lateral feeding roots, it is necessary that the area containing the available food for these plants should be amplified. This object can only be attained by deep cultivation and thorough preparation of at least 8 to 10 inches of the surface soil. The soil to this depth should be made rich and should be put into an ideal condition for the development of plant roots.

The mechanical operations of preparing the soil can be carried on by the use of the modern plow if the area is large enough, or by spading if the area is small. The seed bed should be thoroughly and frequently stirred, so as to grind the soil particles together as much as possible for the purpose of reducing them to a uniformly fine condition and to liberate plant food. Cultivation should also have for its object the destruction of weeds which may interfere with the establishment of the lawn or which may be detrimental to it after it is once established.

^a In addition to the green manure, a liberal dressing of stable manure will add available plant food as well as increase the store of humus. A dressing of twenty 2-horse wagonloads of such manure to the acre is not too much for quick returns and lasting effects.

After the soil has been thoroughly plowed or spaded it should be carefully fined by harrowing or raking, after which it should be thoroughly compacted by the use of a lawn or field roller and the surface again loosened by the use of a steel-toothed rake or a specially constructed

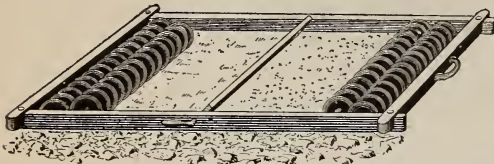


FIG. 1.—Harrow for smoothing and fining the soil preparatory to sowing the seed.

harrow, such as is shown in the accompanying illustration (fig. 1). This implement is frequently used by gardeners for the purpose of accomplishing on a large scale the results obtained by the use of a

steel hand rake on small areas. This treatment will produce a suitable seed bed for the reception of the fine seeds of the grasses.

After the seed bed has been thoroughly and carefully prepared and the grass seed scattered in appropriate quantities, according to the kind used, the surface should be given a careful raking or rolling if the area is dry. If showers have been frequent, raking after the seed has been sown will suffice until after the grass has reached a height sufficient to be clipped by a lawn mower. Prior to clipping the grass with a lawn mower, if the ground was not rolled after seeding, a heavy lawn roller should be passed over the surface in order to make it as smooth as possible. After the grass has an opportunity to become erect it should then be clipped with a mower.

FERTILIZERS.

Since the lawn is a permanent feature, it is hardly possible to make the soil for the reception of the lawn too rich. Stable manure which has been thoroughly composted and rotted and which is as free as possible from detrimental weed seeds is undoubtedly the best material to use in producing the desired fertility of the soil. Forty to sixty loads of well-decomposed stable manure are not too much to use upon an acre of land designed for the greensward. Where such stable manure is not available the next best plan to follow is that previously suggested—the plowing under of green crops, such as clovers, cowpeas, soy beans, and similar plants. The land should then receive an application of about 1,000 pounds of lime to the acre, and at the time of preparing the seed bed 500 to 1,000 pounds of fine-ground bone, together with 300 to 500 pounds of a high-grade fertilizer upon each acre. The fertilizer may contain 3 per cent nitrogen, 6 to 8 per cent phosphoric acid, and about 8 per cent potash.

After the lawn has been established and it has gone into “winter quarters,” it is well to give the young grass a mulch of well-decomposed stable manure, which shall not be heavy enough to disfigure or mar

the lawn, but should be so fine and well decomposed that it will be carried beneath the surface of the grass by the rains and snows of the winter, leaving very little rough or unsightly matter to be raked off in the spring. If this is not desirable, after the greensward has passed through the first winter it should be treated to a top-dressing of fine-ground bone at the rate of 1,000 pounds to the acre.

GRASSES ADAPTED TO LAWN MAKING.

It is evident that not all grasses are adapted to lawn making. Only such kinds as are capable of making a close turf are ideal for lawns. Most grasses which have creeping rootstocks, short joints, and produce long, narrow leaves in abundance about the crown of the plant adapt themselves well to lawn making. Besides this, a desirable lawn grass possesses a pleasing color, which does not change decidedly from season to season, is drought resistant, responds quickly to a change of conditions from winter to spring, and bears repeated clippings with the lawn mower. It will be noted that the requirements of these grasses are exceedingly exacting, and it is not surprising to find the list of such grasses a comparatively short and meager one.

In general, in those localities where ideal soil and climatic conditions are not present a mixture of grasses is better adapted to lawn making than a single variety. Under conditions where the soil and climate are congenial for the development of grasses a more perfect lawn can be made by using a single species than by the use of a mixture.

Kentucky bluegrass is undoubtedly the great lawn maker for all that section of the Atlantic coast region north of Washington, D. C., and for the Allegheny region as far south as northern Georgia. Bluegrass thrives best in a comparatively retentive, strong soil where there is an abundance but not an excessive amount of moisture. Upon soils of a lighter character in this region, in localities where precipitation is greater, such grasses as redtop, Rhode Island bent-grass, creeping bent-grass, and white clover are more to be relied upon for lawn making than bluegrass. Redtop, Rhode Island bent-grass, and creeping bent-grass all have the same ability to make a compact and deep sward, as does bluegrass. In fact, under certain conditions redtop and the bent-grasses are able to make a softer, although not a more permanent, turf than does the bluegrass. Upon the light soils found in the States south of the latitude of Washington, D. C., white clover forms an important feature in lawn mixtures. A typical bluegrass and white clover lawn is shown in figure 2.

In general, because of the varied conditions of shade and moisture existing upon a lawn as the result of trees, shrubs, and architectural objects, mixtures are more desirable than pure grasses. The different degrees of shade and moisture maintained in the soil which result from

the presence of trees, shrubs, and buildings afford a variety of conditions under which a single species would not produce a uniform lawn. These obstructions to the sunlight produce lights and shades in different parts of the lawn, so that any difference which may exist in the color of the various grasses in a lawn mixture is not so obtrusive as it would be were different portions of the area made up of grasses of different hues. Even if there is variation in the tints of the green in the different grasses used in a lawn mixture, this will not be objectionable unless the lawn becomes patched and made up of one variety in one place and a different variety in another.



FIG. 2.—A typical bluegrass and white clover lawn, showing the recent use of the lawn mower in the striped effect.

Lawns in which Bermuda grass has gained an entrance and largely crowded out bluegrass present a very unsightly appearance after killing frosts have occurred in the autumn, the bluegrass remaining bright and green while the Bermuda grass, after having been frosted, turns light brown, thus presenting a very spotted and unattractive appearance (see fig. 3). Under these conditions the Bermuda grass, which in general may be considered a good and desirable lawn grass, becomes a weed. Another weedy grass which is likely to produce a similar effect upon lawns in which the grasses have "run out" is crab-grass, as shown in figure 4. From the city of Washington southward, particularly upon the sandy soils of the Atlantic coast plain, Bermuda grass is the main dependence for lawn making. When the confines of Florida have

been reached, however, the conditions are somewhat different and the warmer climate and greater humidity allow different species to endure, as, for instance, the St. Augustine grass, which has a coarse and very upright leaf, although it has a creeping rootstock. This grass is of special value in Florida, as it remains in a green condition practically throughout the whole year.

Korean lawn grass is a maritime grass from Asia and Australia, which is proving of value along the seacoast from Charleston southward. It thrives well in the latitude of Washington, but the leaves are not hardy and assume a light straw color in winter. It will, however, undoubtedly be a decided acquisition for lawns near the seashore in lati-

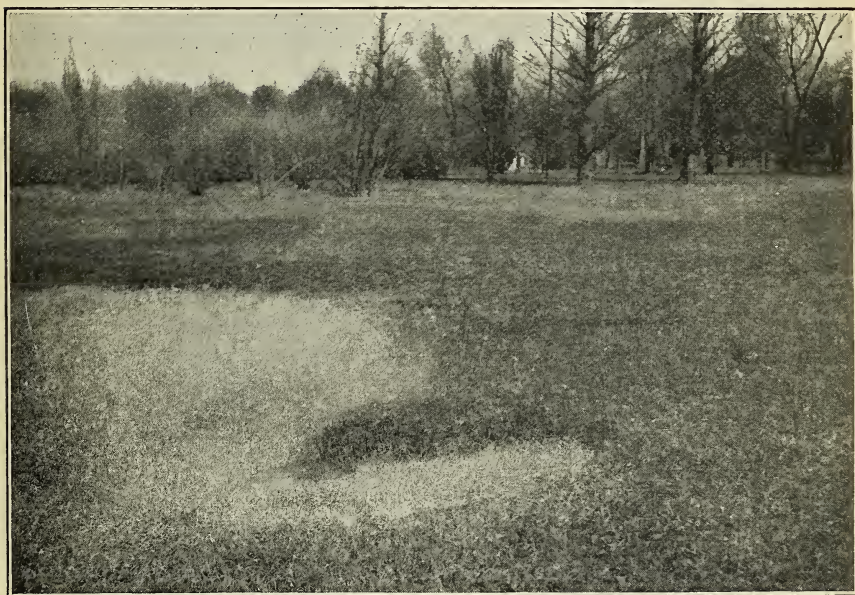


FIG. 3.—Bermuda grass in a bluegrass lawn.

tudes south of Washington. Seashore lawns are each year becoming of more and more interest because of the great number of residences which are being established along the Atlantic coast from Maine southward. While there are known to botanists a number of forms of common grasses, besides bluegrass and redtop, which are maritime, none of these have been taken up by commercial seedsmen and produced in sufficient quantities to be available for lawn making in these regions. Persons wishing to establish lawns under these circumstances must, therefore, depend largely upon the same grasses that are used for the making of lawns farther from the coast—bluegrass, Rhode Island bent-grass, redtop, and white clover. Under coast conditions it is advisable to use even more liberal mixtures of these grasses than

in sections where lawn making is thoroughly understood and where a single species may be used with certainty in establishing a satisfactory lawn.

There are a few grasses which in themselves are well suited to lawn making, but which because of their habits of growth are not well adapted to use in lawn mixtures. Italian rye-grass is a notable example of this type of plant. It is in itself capable of making a fairly good lawn, but because of its more rampant growth and broad leaf blades, which possess a shiny appearance, it does not blend well with other grasses on the lawn—such as redtop, bluegrass, and white clover. It



FIG. 4.—Crab-grass in a neglected lawn.

grows more rapidly than do those species, and always appears as an obtrusive companion upon the lawn. It is, therefore, not advised as an important or desirable feature in a lawn mixture.

For certain areas west of the Mississippi River, where the grasses already mentioned do not thrive, it has been suggested that a native grass, known as buffalo grass, which has the characteristics of a good lawn grass—that is, creeping stems, and short, upright leaf shoots—be employed for lawn purposes. This grass has the ability to withstand drought and to establish and maintain itself under adverse climatic conditions. Since buffalo grass is indigenous to the region and possesses so many qualities which are of importance in a lawn

grass it is worthy of special consideration in this area. It has the one drawback that the seed is not now available in commercial quantities.

Another type of grass which is not used in America to the extent that it might be and to the extent its habits would fit it is the class of plants known as fescues. Some of these species are capable of enduring maritime conditions, while others are able to thrive under considerable shade. The most common species of this type of plant known in America is the sheep fescue, of which there are a number of varieties. This grass has the objection for lawn purposes that it is bunchy in its nature and does not, therefore, produce a smooth and uniform turf like bluegrass, redtop, or bent-grass. However, for shady places red fescue and some other varieties of sheep fescue are worthy of trial, and the fescues may be added to the collection for use upon lawns near the seashore.

In the Gulf coast country, particularly throughout Louisiana, the grass known as carpet grass has for a number of years been extending its domain, and of late has been attracting considerable attention for use upon lawns. It has a habit of growth very similar to that of Bermuda grass, and it is possible that when it shall have been given a thorough test its region of adaptability will be coextensive with that of Bermuda grass. Under some conditions it thrives and maintains itself to even a greater extent than does the Bermuda grass. It also has another advantage in that in certain localities it produces seed which with a little care may be gathered and may become a commercial commodity. Whether or not carpet grass will carry its seeding habits to its northern limits remains to be determined. It is readily propagated from turf, like Bermuda grass, and can easily be established upon a lawn.

SEED.

In procuring seed for establishing a lawn, too great care can not be exercised. Pure seed, of high germination, is of great importance in securing a good stand of grass. Pure seed is the keynote to a clean lawn, provided the work of preparing the land has been efficiently done. Thorough preparation involves not merely the mechanical treatment of the soil to reduce it to a proper seed bed, but the use of weed-free manure and the adoption of a course of treatment previous to preparing for the lawn which shall serve to eradicate weeds. Such preparation, coupled with pure seed, should give a satisfactory stand of grass which shall need only the usual care necessary to maintain a lawn after it is once established. Too much can not be said in favor of securing pure seed, and, if possible, specially selected seed. This is of considerable importance with light seeds like bluegrass, redtop, and seeds of the bent-grasses. In the case of bluegrass, select seed weighs about 22 pounds to the bushel, while the ordinary grade of

bluegrass, although it may be called pure, averages about 12 pounds to the bushel. Select or recleaned bluegrass is, therefore, the most economical to buy, although the original cost is considerably more than that of the common commercial article.

The stand of grass resulting from the use of recleaned, selected seed is much more uniform than when seed containing a great number of hulls and light seeds is employed. The same remarks hold with the bent-grasses, and even with white clover; although the market at the present time does not offer as much opportunity for selection with this last-named seed as with the bluegrass.

The quantity of seed to be used upon a lawn is of decided importance. It is better to use an excessive amount of seed and allow natural selection to eliminate the weak specimens rather than to seed sparsely with the hope that the natural habits of the plants will be sufficient to enable them to take possession of the entire area. A thick stand of plants of the desired species gives little opportunity for the development of weeds, while a thin stand of the same species offers a place for the growth of weeds, which may become determined competitors for the possession of the ground, thus subjecting the gardener to the necessity of eliminating the weeds or of reestablishing the lawn. Heavy seeding of grass is, therefore, a very important matter in the establishment of lawns.

Bluegrass, bent-grass, and the fescues, if used in combination, should be sown at the rate of 2 to 3 bushels of seed to the acre. Bluegrass, if used alone, should not be used at a less rate than 2 bushels to the acre, while white clover, if added to the collection of the above-named sorts, should be used at the rate of a peck to the acre. Upon sandy lands and in spring seeding white clover is a very important factor, because it germinates quickly and covers the ground, affording protection and presenting an attractive appearance earlier than is possible by the use of the other grasses. White clover, too, is able to reestablish itself very quickly after periods of severe drought, and until the bluegrass, redtop, and bent-grass become thoroughly established the white clover will usually be in the ascendent. As the turf-forming habits of the other grasses become more strongly marked, however, the white clover will gradually disappear and give place to the other more permanent grasses.

ESTABLISHING A LAWN.

The successful establishment of a lawn depends upon the careful preparation and the proper fertilization of the land and the selection and planting of appropriate grasses. In those localities where a lawn can be established by the use of seeds the preparation of the seed bed and the selection and sowing of the seeds are exceedingly important

questions. General directions for the preparation of the soil have already been suggested. In order that seeds of suitable character may be secured, it is desirable in the first place to determine the varieties which succeed best in the locality. In the northeastern part of the United States bluegrass, redtop, Rhode Island bent-grass, and white clover are the chief constituents of lawn mixtures. In the latitude of Washington, D. C., bluegrass and white clover, Rhode Island bent-grass, and Bermuda grass are all more or less important lawn grasses. Bermuda grass seed is not commercially grown in the United States, and because of the expense of the Australian product the only economical means of propagating this grass is by division of the rootstocks. In those sections where seed sowing is depended upon a very finely compacted upper stratum of soil is essential.

In order to secure a uniform distribution of the seed, the seeding should be done in two directions. The seed should be divided into two lots, one of the lots being scattered in one direction across the land and the other scattered at right angles to the first. This is done in order to obliterate as far as possible balks and streaks in scattering the seed.

Since grass seed is very small, every precaution should be taken to bring the seed in close contact with the soil. Nature does this in an ideal way by gentle showers. It is therefore desirable upon small areas to sow the seed immediately before a shower. If the shower is a gentle one of some duration, it is more desirable than a violent rain. Torrential rains, if the surface of the lawn is sloping, usually cause damage, which must be repaired.

In the case of establishing lawns, if the grasses which grow from seed can not be used, it is necessary to resort to one or the other of the following methods: (1) The establishment of the lawn by the use of small tufts of grass or pieces of turf planted at intervals sufficiently close to allow the natural spreading of the plant to soon take possession of the entire area, or (2) covering the entire area with turf. In the Southern States, where the Bermuda and St. Augustine grasses are depended upon for lawn purposes, the common practice is to cut the turf up into small fragments, about 2 inches square, or to take small tufts of roots and stalks of the grass, as much as can be easily grasped in the hand, and insert them in the soil at intervals of about 10 or 12 inches in each direction. When not planted in check rows in this fashion the roots are usually set in rows or drills 12 or 15 inches apart in one direction, with the tufts of grass 6 to 10 inches apart in the row. Slight cultivation is then practiced between these rows to keep down weeds until the rootstocks of the plants have gained possession of the entire area.

TERRACES AND BANKS.

Upon terraces and banks where grass can not be readily established from seed or by planting, as before indicated, the sod or turf is usually removed from some area where suitable grass is well established and used to cover the entire surface of the bank or terrace. A common method employed in this work is to cut the sod into pieces a foot square and about 2 or 2½ inches thick. This answers well upon small areas if the sod is cut to a uniform thickness and the surface of the ground is made very smooth; otherwise, there is more or less difficulty in getting the squares of sod adjusted evenly so as to produce a smooth surface. Considerable ramming or pounding is necessary in order to establish the desired smoothness, unless great care is exercised in cutting the turf to a uniform thickness and in providing a smooth surface to lay it upon. In order to overcome this difficulty when extensive sodding operations are to be undertaken, a device which in its action is similar to an ordinary carpenter's plane is used. Such an implement

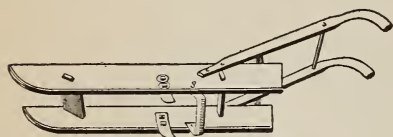


FIG. 5.—Implement used for cutting sod.

is shown in the accompanying illustration (fig. 5). This device is used to cut long strips of turf. After the strips of turf have been cut by horsepower with the implement illustrated, they are rolled into rolls of convenient size for handling and

the sodding is accomplished by unrolling the turf over the area to be grassed. After placing the sod in position it is thoroughly rammed down with a heavy wooden maul or pressed down with a lawn roller in order to produce a uniform and smooth surface.

Upon steep banks which are of a sandy nature, and under conditions where it is difficult to use sod, a pleasing appearance can be produced by the use of Japanese honeysuckle (*Lonicera japonica*). This plant is capable of establishing and maintaining itself under adverse conditions, and it makes a good soil binder and has the advantage of being evergreen.

WHEN TO PLANT A LAWN.

There is a legitimate difference of opinion in regard to the season at which it is best to plant a lawn. There are those who are very successful in lawn making who depend almost entirely upon fall planting, and there are others who are equally successful who advocate the practice of spring planting. Both of these systems are successful, and the prospective lawn maker can use the method which best suits his convenience. If the seeding is to be done in the autumn, the latter part of August or the month of September is the best period for accomplishing the work in latitudes between Washington and Boston. In

the southern portion of this zone the work may be deferred until October. The preparation of the land for this work should be thorough. The seed bed should be made very fine and every precaution taken to give ideal conditions for the germination of the seed.

If possible the seeding should be done at a time when the fall rains are most abundant, but, as frequently happens in the eastern part of the United States, within the zone mentioned there is a more or less protracted drought during the fall. It is not advisable to sow the grass seed during a dry period, unless there are at hand artificial means for watering which can be used to force rapid germination and growth.

Fall planting has the advantage of allowing a number of the weeds in the area to germinate and be killed by the frosts and freezes of the winter. If the grass attains a height of $2\frac{1}{2}$ or 3 inches before winter there is little danger of loss from severe weather. In localities where the surface of the earth is not protected during winter by a snow cover and the ground is likely to freeze and thaw repeatedly it is not advisable to attempt to establish a lawn in the autumn.

Spring planting is more certain of results than fall planting in the long run, particularly in the zone under discussion. The drawback to spring planting is that work must frequently be delayed longer than is desirable because of unfavorable soil conditions, particularly upon heavy and retentive soils. Young plants suffer severely from heat and drought if they have not had an opportunity to grow and form considerable root before the hot period comes on. Weeds which come in advance of the spring planting of the lawn can be overcome in a measure by giving the land partial preparation in the autumn and allowing the first crop of weed seed to germinate before cultivation and the preparation of the seed bed is completed, using this cultivation to destroy the first crop of weeds as well as to prepare the seed bed for the lawn. The later weeds can be held in check by frequent clippings with the mower.

MAINTENANCE OF A LAWN.

All the operations connected with the maintenance of a greensward are directed toward securing a uniform sod or turf over the entire extent of the lawn. In order to secure this the plants which constitute the lawn should be kept in a luxuriant, vegetative condition and never allowed to go to seed. There is no operation connected with plant life which is so trying upon the vitality as the production of seed. In order to keep a close, even surface over the area, it is necessary to use a mower frequently, but in using the mower the clipping should not be done close enough to deprive the plants of sufficient leaf area to carry on their normal functions; that is to say, as a general rule the lawn mower should be set high rather than low.

Upon newly established lawns the operation of clipping should not be delayed until the grass is too high. As soon as a mower with a blade 2 inches high will cut the ends of the leaves, the mower should be passed over the surface. By repeating this at close intervals during the growing season a better and more uniform stand of grass will be secured.

It is a mistake to allow a lawn to go in an unkempt condition during the first months of its existence. It should from the beginning be subjected to the same treatment which is to be carried on later in its life. It is not advisable to clip the lawn frequently during periods of drought, but even during these periods it is not well to allow the plants to produce seed stalks. The general plan of keeping a lawn clipped to a height of 2 inches is a very safe one to follow. The clipping, too, should be sufficiently frequent to prevent the necessity of raking off any considerable quantity of material after each clipping. If the soil is moist, very rich, and the growth luxuriant, it will be necessary to rake off the clippings, but on comparatively poor soils the clippings will not be detrimental unless they produce an unsightly effect. Before growth has advanced to any considerable extent each spring, the lawn, as soon as it is comparatively dry, should be gone over with a heavy lawn roller, so as to embed firmly any of the grass roots which may have been loosened by frosts and to reduce the surface to a uniform condition.

The winter top-dressing has already been referred to, and upon soils which are not uniformly very rich and retentive this dressing is very desirable, as it not only furnishes a winter protection for the roots of the plants, but supplies them with a liberal quantity of immediately available plant food for starting growth in the spring. In some localities it is necessary to give special attention to the eradication of persistent weeds, such as plantains, dandelions, and other deep-rooted plants of this character. Where these can not be crowded out by constant clipping and the use of a liberal dressing of fertilizer, it becomes necessary to remove them by the use of a trowel or knife. If the lawns become depleted and a large percentage of the vegetation is composed of dandelions, docks, or plantains, it will in general be most economical to break up and reestablish the lawn rather than attempt to eradicate these weeds by the use of a trowel or knife.

RELATION OF WALKS AND DRIVES TO THE GREENSWARD.

While walks and drives should always be direct, they should be made to conform to the contour of the surface. In large areas and where the surface is undulating they should follow the contour of the land instead of being made straight. On small areas, however, there is no advantage in curved walks. The straight line is the shortest

distance between two points and in general furnishes the most appropriate approach to a house or outbuilding. The relation of the greensward to the walk or drive, however, is not that of directness, but that of beauty.

All walks and drives in private places or in parks should be sufficiently below the level of the greensward to be hidden from the observer standing at right angles to the walk and a few hundred feet from it; that is, to such an observer it should present an unbroken, continuous effect. By this means the apparent extent of the area can be greatly increased, while, if the walk or drive should be elevated above the level of the greensward, the lawn would have the appearance of being cut up into small patches or plats—a very undesirable condition in the lawn of a park or private place.

The edges of the greensward should be carried to the edge of the gutter or walk with a gentle roll rather than with an abrupt bank. Banks or terraces are not desirable. Gentle, sloping surfaces are more easily kept in position, more easily grassed, and present a more pleasing appearance than abrupt banks. The gentle roll, when properly made, will serve the same purpose in edging the walk or drive as the abrupt bank.

In general, walks and drives through areas in which lawns predominate should be made of harmonizing material; that is, gravel or dirt roads are to be preferred to any form of pavement. The walks if made of gravel are more in keeping with the general character and aspect of the place than if made of asphalt or either natural or artificial stone. Where there is a great deal of traffic, which is not usually permitted in parks, some form of pavement or permanent walk other than that afforded by gravel must be used. The color of the walk and drive should not present a striking contrast to the greensward. Subdued colors are to be preferred to bright, glistening material for the construction of walks and drives.

RELATION OF TREES AND SHRUBS TO A LAWN.

As has already been suggested, trees and shrubs upon small places should occupy subordinate positions. They should not be scattered promiscuously over the surface of the lawn, but should be used in groups about the border of the grounds, in the bays of walks and drives, and about the foundation of the architectural features of the place. Street trees of necessity must be planted in rows, but all other adornments in the form of trees and shrubs should be used in a free rather than in a formal fashion. Sheared hedges of box or privet along the front of a place or upon the borders of the walks and drives are seldom or never desirable features, unless the whole treatment of the place is formal. A specimen tree or shrub if properly located

upon the lawn so as to break up the barrenness of a corner or to limit the vision in any direction is an appropriate object. Oftentimes trees and shrubs can be used to good effect in the immediate vicinity of buildings for softening or relieving staring architectural lines. Of late many plans for the decoration of gardens and grounds have suggested the use of trees and shrubs more in the manner of paling fences and statuary than as living objects carrying individuality. The aim should be to preserve the natural lines and characteristics peculiar to each species of plant used in any decorative scheme rather than to shape the plants into artificial forms. It is the height of folly to prune evergreens in the form of Chinese vases, animals, and articles of furniture. This type of distortion is becoming altogether too prevalent in the mad rush toward the supposed return to nature. Let us not forget in the treatment of our places that nature unadorned is adorned most, and that the normal, naturally pruned tree or shrub is much more beautiful than the one which has been trimmed into mimicry of some artificial object.

Trees and shrubs should be used to conceal unsightly objects in the foreground or in the background, to give the idea of surprise or discovery in passing from one portion of a large estate to another, and for the purpose of increasing the apparent length in drives which double back upon themselves in parks and pleasure grounds. Evergreens which are used upon the lawn should have the lower branches preserved so as to produce the effect of arising from the ground not merely by a single stem but as a mass. Shrubbery groups should also be chosen so as to carry the foliage of the group to the greenward rather than to present a considerable extent of bare stalk between the foliage of the shrub and lawn.

As was stated at the outset, the lawn is the canvas upon which the architectural and landscape effects are to be produced, and all artificial structures, as well as plantations, should be made to harmonize with the contour of the ground and with the general scheme of the place, so as to produce a harmonious and pleasing picture.